The supply & demand of motivated labor: When should we expect to see nonprofit wage gaps?

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Abstract

Nonprofit workers earn less on average than for-profit workers. Existing empirical work leaves open the question of whether this is driven by a willingness to work for less (the "labor donation hypothesis"). Wage gaps have consistently been found to be present in some industries and absent in others. In this paper, I consider when we should expect labor donations to nonprofits to generate wage gaps and, in doing so, offer an explanation for the previous inconsistent results. I highlight the importance of nonprofits' labor demand. Specifically, it is only in nonprofit employers' interest to maintain low wages if their labor demand does not exceed the number of workers who are willing to work for less. Otherwise, nonprofits must raise wages to attract other workers. This yields the prediction that wage gaps should be largest when the nonprofit share of labor within an industry is low. As nonprofit share increases, wages should equalize. Using economy-wide Census microdata, I provide evidence consistent with this prediction. I use more detailed data from the nursing home industry to better control for market conditions and rule out alternative explanations. I find that the quality of work in nonprofit nursing homes is highest in localities with low nonprofit share, where wage gaps are largest. This provides evidence that the relationship between wage gaps and nonprofit share is driven by "motivated types" sorting into nonprofit jobs.

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1. Introduction

A long literature examines differences in wages across the for-profit and nonprofit sectors. Some empirical work finds clear evidence that nonprofit workers earn less. The most prominent explanation for this finding is the "labor donation hypothesis," which suggests that some individuals enjoy nonmonetary benefits from working in a nonprofit and as such are willing to work for less.[1] An alternative explanation is that nonprofits tend to locate in lower-paying industries, so composition effects rather than differential preferences of workers may drive the observation of a nonprofit wage differential. However, as demonstrated by Leete (2001) even after carefully accounting for industry and occupation, a nonprofit wage differential exists in some industries but not others – a puzzling result for either of these two prominent explanations.

I offer a potential explanation for the emergence of wage differentials in some industries but not others and, in doing so, revisit the mechanism through which these wage differentials arise more generally. Building on a point made by Preston (1989), I test the hypothesis that a nonprofit wage differential should exist within an industry when the share of labor demanded by nonprofits is low relative to for-profits. I start from the assumption that some workers are in fact willing to donate their labor. That is, there exist "intrinsically motivated" types – who receive nonmonetary benefits from working for a nonprofit – and "extrinsically motivated" types – who, holding wage constant, do not differentiate between nonprofit and for-profit jobs. As long as there are enough intrinsically motivated workers to meet their labor demands, nonprofits can minimize costs by offering a low wage (thereby, only attracting intrinsically motivated applicants.) However, if nonprofit labor demand is high relative to for-profit firms, the nonprofit cannot rely on intrinsically motivated workers alone to fill their demand and must offer wages comparable to that of for-profits in order to attract extrinsically motivated workers.

I test this hypothesis empirically in two stages. In both stages, rather than attempting to make comparisons across very different industries, I examine the impact of the nonprofit share of labor *within* industries but *across* localities. The first stage assesses the relationship between nonprofit

[1] "Labor donation theory" or the "donative labor hypothesis" is an idea which has been suggested in various forms by a variety of researchers; see, for instance, Weisbrod (1983), Preston (1989), or Leete (2006) for a thorough review.

share of labor and wage differentials at an economy-wide level using data from the 2000 Public-Use Microdata 5%-sample of the United States Census. I construct industry/locality-specific nonprofit shares of labor and include a full set of industry fixed effects in all specifications. I find evidence that low nonprofit share – where I argue that there is a sufficient number of intrinsically motivated workers to meet labor demand – is indeed associated with larger negative wage differentials; this is almost entirely driven by college-educated workers. However, there are a number of alternative explanations for this result that data limitations do not allow me to address.

Thus, in the second stage, I focus my attention only on the nursing home industry, for which I have much richer firm-level data on roughly 95% of nursing homes in the United States. Again, exploiting variation in nonprofit share across localities, I replicate the result from the economy-wide data. I then provide evidence that suggests that this result is not driven by: (1) differences in the competitive environment faced by nonprofits in low nonprofit share areas, (2) preferential state/local government treatment of nonprofits in some areas (which might generate both high nonprofit share and the ability to pay higher wages), or (3) lower quality workers in low nonprofit share areas. In fact, I find that nonprofit workers in low nonprofit share areas produce *higher* quality output (despite being paid less). This is consistent with the impliciations of a simple model I present in section 4; in particular, by maintaining lower wages nonprofits attract only workers who are "intriniscially motivated" and who therefore supply higher effort than is required of them.

The remainder of the paper proceeds as follows: In section 2, I review in more detail existing research on nonprofit wage differentials. In sections 3 and 4, I discuss the predictions that I test empirically, first in a general way (section 3) and then with more precision using a simple model (section 4). In section 5, I conduct the economy-wide analysis and show that nonprofit share of labor indeed appears to be an important determinant of the existence of wage differences across sectors (primarily for highly educated workers.) In section 6, I use a richer dataset from a particular industry to rule out concerns and alternative explanations that cannot be addressed using the economy-wide data. Section 7 offers concluding remarks.

2. Related literature

The main challenge in determining whether labor donation theory is a reasonable model of nonprofit labor is finding the appropriate for-profit workers to compare nonprofit wages against. That is, if what appears to be a "nonprofit" wage differential is in fact driven by differences in industry composition across the sectors, then all that exists is an industry wage differential. Two main strategies have been employed to account for the differences in industry composition across the two sectors: (1) comparing workers within a particular industry/occupation and (2) including detailed industry and occupation fixed effects in economy-wide data. However, the conclusions that result from each of these strategies have been inconsistent.

The earliest assessments of labor donation theory are typically of the first variety, in part because the data necessary to (properly) employ the second strategy did not yet exist. For instance, Weisbrod (1983) compares public interest lawyers to private lawyers and demonstrates that, controlling for observable characteristics, public interest lawyers earn significantly less. Moreover, he provides evidence from survey data that suggests that these lawyers actively select into the lower-paying field -- public-interest lawyers report being fully aware of the potential earnings they have lost and almost uniformly indicate that these losses are "worth it." Frank (1996) provides a similar result. However, using the same data as Weisbrod but with a different econometric approach, Goddeeris (1988) finds little evidence of a pay gap between public interest and private lawyers.

Preston (1988), in a comparison of nonprofit and for-profit daycare center workers, finds no wage differential in non-federally regulated centers (and a *positive* nonprofit wage differential in centers that are regulated.) However, the absence of a (negative) wage differential is perhaps unsurprising in this context as more recent research demonstrates that we primarily observe differentials amongst highly educated and "white-collar" workers (Leete, 2001), a result which is found in this paper as well. Borjas et al. (1983) and Holtmann and Idson (1993) find little evidence of a pay gap between wages in nonprofit and for-profit nursing homes.

Thus, amongst the papers that attempt to determine whether the implications of labor donation theory hold in specific contexts, no conclusion has been reached. It remains unclear as to whether these divergent results stem from particular (and not yet well defined) characteristics of the industries that have been considered or if this is suggestive that, generally speaking, the implications of labor donation theory are not widely applicable. Thus, more recent research has examined economy-wide data to determine whether labor donation theory is meaningful at a more general level. An early attempt to do so indeed finds a significant nonprofit wage differential, but suffers from a lack of quality data (Preston, 1989); namely, Preston uses data from the Current Population Survey, which had not yet started asking respondents to identify whether they were nonprofit workers.

Ruhm and Borkoski (2003) also use data from the Current Population Survey to examine whether differentials exist on an economy-wide level, but are able to specifically identify nonprofit workers. They find a small negative wage differential that is not significantly different than zero, which they take as evidence that nonprofit wages are determined in competitive markets "without explicit labor donations." However, they employ limited controls for industry and occupation differences. Leete (2001) on the other hand, using 1990 Census microdata, employs a full range of industry and occupation fixed effects. While she too fails to detect an economy-wide wage differential, she does find large and significant wage differentials in particular industries. Narcy (2011) examine wages across sectors in France and finds a significant negative wage-differential at an economy-wide level.

Although attempts to test the *implications* of the labor donation hypothesis (by searching for wage gaps) have led to inconclusive results, there is accumulating *direct* evidence of differences in workers and willingness to donate labor across sectors. Using data from the National Longitudinal Study of Youth, Benz (2005) documents higher levels of job satisfaction amongst nonprofit employees. Lanfranchi et al. (2010) find that nonprofit workers' "ideal number of hours worked" is higher than that of for-profit workers and that they are willing to receive less compensation for additional hours worked. Gregg et al. (2011) show that workers who are more willing to "donate labor" (as measured by their willingness to engage in unpaid overtime work) are indeed more likely to sort into the nonprofit sector. Serra et al. (2011) obtain survey- and

experimental-based proxies of prosocial motivations and find that these measures are predictive of health professionals' selection into the nonprofit sector.

Thus, there appears to be some evidence of workers donating their labor, though the circumstances under which this leads to wage differentials is unclear. The only potential consensus to draw is that the existence and magnitude of nonprofit wage differentials depends heavily on the particular industry and/or occupation in question. This is demonstrated most clearly by Leete (2001). Yet, it remains unclear why we would observe a wage differential in some industries but not in others and also what factors are important in determining which industries are impacted.

3. General hypotheses & contribution to the literature

With this literature in mind, I reconsider the labor donation hypothesis focusing more specifically on the circumstances under which we should expect nonprofit firms to offer lower wages. In doing so, I hope to provide a better understanding of why nonprofit wage differentials are observed in some cases but not others, particularly given recent direect evidence that nonprofit workers are willing to donate thier labor. Broadly speaking, the claims I make are the following:

1. *A wage differential is observed for industries with low share of labor relative to the for-profit sector.*
2. *For industries with large nonprofit share of labor, the difference between for-profit and nonprofit wages approaches zero.*

The intuition behind these claims (which is described with greater precision in a simple model in the next section) begins with the assumption that there are in fact some workers who are willing to donate their labor to a nonprofit firm. (Throughout, I refer to this set of workers as "intrinsically motivated.") However, the presence of intrinsically motivated workers alone does not guarantee that we would observe wage differentials. Specifically, it must be in nonprofit firms' interest to maintain wages below the market wage. Of course, if workers are willing to

accept lower wages, then offering the lowest wage possible minimizes costs. (Additionally, if nonprofit firms have a preference for intrinsically motivated workers, then they can guarantee that only these workers will apply by setting a wage lower than the for-profit wage.)

However, this is only possible if the total demand for labor in the nonprofit sector exceeds the number of intrinsically motivated workers. Otherwise, the nonprofit firm is forced to attract extrinsically motivated workers; thus, the nonprofit firm must offer the for-profit wage and, because motivation is not observable, it must pay this wage to all workers (including those who are willing to work for less). As a result, whether a nonprofit wage differential is observed or not in an industry depends crucially on whether the nonprofit share of labor in that industry exceeds the proportion of intrinsically motivated workers.

3.1 Interpreting "instrinsic motivation"

All that is required for this argument is that the "intrinsically motivated" worker receives *some* form of nonmonetary benefit from working at a nonprofit firm. The previous literature on labor donation theory offers a number of reasons why this might be true. Workers may receive "warm glow" or "moral satisfaction" from contributing to the production of a public good (Preston (1989), Frank (1996)). Rose-Ackerman (1996) suggests that committed workers may be easier to attract because "the lack of equity holders is a signal to employees that their selflessness is not enriching someone else." Hansmann (1980) proposes a slightly different motivation: even if nonprofits produce the same *type* of goods as comparable for-profits, nonprofits still differ in that they tend to offer *higher quality* products than would otherwise be profit-maximizing. This is often true, for instance, in healthcare industries. Thus, workers who are motivated to do "good work" may be willing to sacrifice wages. Still other motivations are possible: some may prefer the work environment offered by nonprofits; alternatively, individuals may be motivated to work at a nonprofit to signal to themselves or others that they are the type of person that would do so (Bénabou & Tirole, 2006).

4. Model

In this section, I offer a simple model to add precision and more carefully consider the argument made above. The model builds upon a literature on signaling and screening of worker motivations (Delfgaauw & Dur, 2007; Heyes, 2005), which suggests that, if some workers are intrinsically motivated to work in a particular job, but motivation is not observable, firms might use their offered wage as a screening device. By setting a wage lower than the reservation wage of extrinsically motivated workers, they are guaranteed to attract only intrinsically motivated workers who receive additional nonmonetary utility from working for the firm. Here I simplify and adapt the model of Delfgaauw and Dur (2007) to understand the implications of this model in the context of nonprofit wage-setting.

4.1 Basic environment

Suppose there are N workers who choose between job offers at a nonprofit firm (NP) or a for-profit firm (FP). Job offers at each firm are defined solely by wage; required effort is identical across the two jobs. FP serves as an outside option for workers not willing to work at NP; I therefore assume that FP sets as their wage the lowest wage that workers are willing to accept. NP chooses a wage to minimize costs.

All workers choose a firm (NP or FP) and effort level to maximize:

$$u(x) = w_s - c(x)$$

where w_s is the wage in firm s, and $c(x)$ is the cost of effort. However, w_s is only received if $x \geq e$, where e is the required level of effort at either NP or FP. I assume that there are two types of workers: E (extrinsically motivated) and I (intrinsically motivated), where the proportion of I workers is P_I (with $P_I \in (0,1)$). The utility extrinsically motivated workers receive is given by $u_E(x) = w_s - x^2$ regardless of employer. Intrinsically motivated workers, to some extent, derive

positive utility from offering effort to the firm. Thus, intrinsically motivated workers' utility depends on the firm that they work for:

- If employed by FP: $u_I(x|FP) = w_{FP} - x^2$
- If employed by NP: $u_I(x|NP) = w_{NP} - (x - m)^2$

Intrinsic motivation is captured by the addition of m to the cost of effort function. Under this specification, utility is not strictly decreasing in effort and workers have some preferred level of effort that is greater than zero.

4.2 Worker Behavior

FP firms offer the minimum acceptable wage ($w_{FP} = e^2$), so workers never prefer to not work. Extriniscally motivated workers choose jobs based solely on wages. Thus, they choose FP so long as $w_{FP} > w_{NP}$ and supply minimum effort e in either job.[2] Intrinsically motivated workers supply minimal effort e in FP but supply effort $m > e$ in NP. Thus, they choose NP when $w_{NP} \geq w_{FP} - e^2$.

4.3 Nonprofit firm behavior

The nonprofit firm aims to minimize labor costs while producing the quantity, q, that is demanded by the market. That is, the firm solves the cost minimization problem:

$$min_{w_{NP}}[w_{NP} n_{NP}]$$
$$\text{such that } q = k n_{NP} \bar{e}(w)$$

where n_{NP} is the number of workers in NP, k is the marginal product of a unit of effort, and $\bar{e}(w)$ is the average effort provided by NP workers. Average effort $\bar{e}(w)$ depends on the type of workers that sort into NP based on offered wages:

[2] We will assume that if $w_{FP} = w_{NP}$, extrinsically motivated workers apply for an NP job and return to FP if rejected (this is purely for convenience and does not impact the basic message of the argument).

$$\bar{e}(w) = \begin{cases} 0, & w_{NP} < w_{FP} - e^2 \\ m, & w_{NP} \in [w_{FP} - e^2, w_{FP}] \\ P_I m + (1 - P_I)e, & w_{NP} \geq w_{FP} \end{cases}$$

Thus, NP will never set $w_{NP} < (w_{FP} - e^2)$ or $w_{NP} > w_{FP}$. Because $e < m$, average effort is highest when $w_{NP} \in [w_{FP} - e^2, w_{FP})$. However, the NP firm can only produce q and set a wage in this region if there are enough intrinsically motivated workers to do so; that is: $n_{NP}/N \leq P_I$. If the necessary share of nonprofit labor exceeds the proportion of intrinsically motivated workers – $n_{NP}/N > P_I$ – the firm is forced to offer $w_{NP} \geq w_{FP}$ to attract extrinsically motivated workers and produce q.

4.4 Resulting predictions

NP minimizes costs by choosing $w_{NP} = w_{FP} - e^2$ when $n_{NP}/N < P_I$ and $w_{NP} = w_{FP}$ otherwise. With $w_{NP} = w_{FP} - e^2$, only intrinsically motivated types sort into the nonprofit sector. Otherwise, both types may do so. This yields two predictions:

1. Thus, a nonprofit wage differential emerges only when nonprofit labor share is relatively low and does not exceed the proportion of intrinsically motivated workers in society. As nonprofit share increases, the gap between wages across the two sectors shrinks.
2. Average effort is higher in nonprofits when nonprofit share is low. As nonprofit share increases, the gap between effort across the two sectors shrinks.

For the most part, the empirical analysis will address the first prediction. However, in Section 6 (where I have sufficiently detailed data to assess the quality of workers' output) I provide evidence in favor of the second prediction.

5. Empirical approach & hypotheses

With these predictions, we should observe nonprofit wage differentials in industries with relatively low labor shares (relative to for-profits in the same industry). Though she does not discuss this relationship, Leete's (2001) results are consistent with this claim. Figure 1 plots

nonprofit share for each industry included in her analysis against her estimated wage differentials.

However, because the industries being compared here are very different, we should be hesitant to draw inferences from this simple relationship; the relationship could stem from other characteristics of industries that lead them to simultaneously display low nonprofit shares and larger wage differentials. This problem is of course part of the reason that there is little consensus in the existing literature that examines very specific contexts; namely, it is unclear whether to interpret the absence of a wage differential in some contexts as evidence against labor donation theory generally speaking or as simply stemming from some specific characteristics of that particular context.

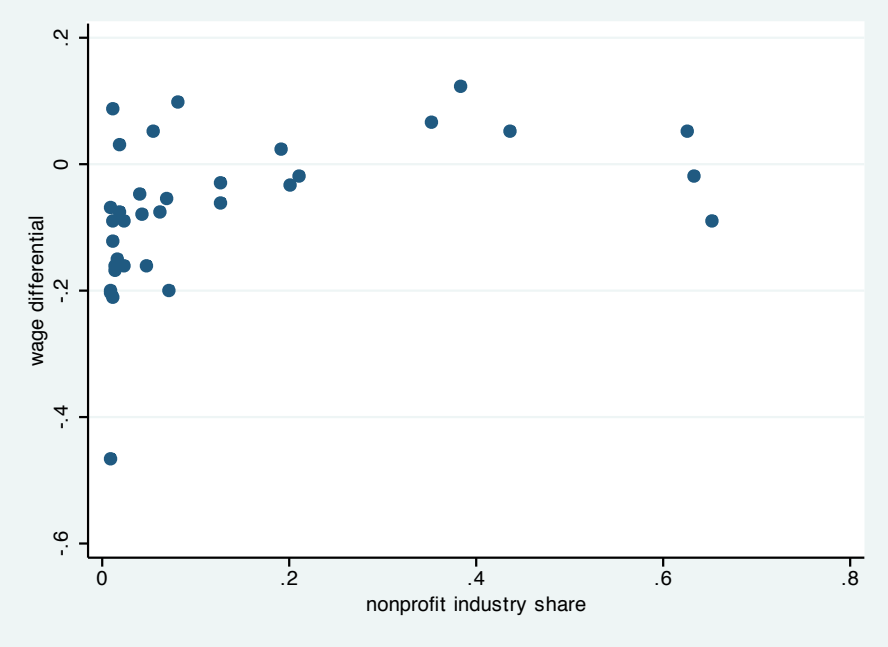

Figure 1: Relationship between estimated wage differential and nonprofit share from Leete (2001) -- Each point represents a particular industry

To avoid this problem, I will instead compare wage differentials *within* industries but *across* localities. This will be accomplished by including a full range of industry fixed effects. For instance, rather than comparing the wage differential amongst radio workers (an industry with low nonprofit labor share) to that of hospital workers (an industry with very high nonprofit labor

share), I compare the wage differential of radio workers in a locality with *low* radio-worker nonprofit share to the differential amongst radio workers in a *different* locality with *high* nonprofit labor share. If the argument above is correct, then, for a particular industry, nonprofit wage differentials should be largest amongst localities with low nonprofit share and wages should be roughly equal in localities with high nonprofit shares.[3]

To summarize then, the broad explanation I offer for variance in differentials across industries is that, in industries with low nonprofit share, there are enough intrinsically motivated workers in society (and within the particular industry in question) such that the nonprofit sector can rely only on those workers and therefore does not need to match the for-profit wage in an attempt to attract extrinsically motivated workers. However, for industries with large nonprofit shares (like hospitals) all of the intrinsically motivated workers have already been exploited and firms must raise wages to attract other workers. Thus, wage differentials are only observed in industries with low nonprofit shares. The empirical hypotheses I will test to assess this claim are that, within industries, wage differentials will exist in localities with low industry/locality-specific nonprofit share, but as nonprofit share increases, the differential will be eliminated.

6. Economy-wide analysis

6.1 Data and estimation approach

I first test the claim that nonprofit wage differentials depend on the nonprofit share of labor using microdata from the 5%-sample of the 2000 Census. Specifically, I construct nonprofit shares by

[3] Note that this argument assumes some limitations on mobility. Namely, we might think that if moving is costless, intrinsically motivated workers would locate to areas where the nonprofit wage differential has been eliminated where they can obtain both higher pay and the nonmonetary benefits of working for a nonprofit. However, keep in mind that in the explanation provided above, when nonprofit share is low and a wage differential exists, intrinsically motivated workers are only competing with other intrinsically motivated to obtain a particular position. This is no longer true when wages are equal across sectors, in which case all workers are competing for the nonprofit job. This barrier to entry to nonprofit jobs in areas with high nonprofit shares combined with some mobility cost makes it reasonable to assume that, to some degree (and at least in the short-run), tied to their current location. Moreover, insofar as mobility does pose a threat to this empirical strategy, it would only lead to an underestimate of the true effects.

industry at the Super-PUMA level.[4] That is, for a particular industry i and Super-PUMA s, nonprofit share (NPS) is constructed as the sum of observed nonprofit workers divided by the sum of all observed workers in the industry/locality:

$$NPS_{is} = \frac{(\text{total nonprofit employment})_{is}}{(\text{total nonprofit employment})_{is} + (\text{total for} - \text{profit employment})_{is}}$$

Because we are exclusively interested in labor markets where workers can sort into either nonprofit or for-profit jobs, I omit industry-locality groupings with nonprofit share equal to 0 or 1 – that is, labor markets totally dominated by either nonprofits or for-profits. Moreover, to avoid unreliable NPS measures I omit industry-locality groupings with less than 100 total workers, though results are similar without this restriction.

Restricting attention to full-time workers in the nonprofit and for-profit sectors, the main estimating equation is given by:

$$ln(earnings) = \alpha + \beta_1 \text{nonprofit} + \beta_2(\text{nonprofit} \times \text{NPS}) + \beta_3 \text{NPS} + [\text{controls/FEs}]$$

where "nonprofit" is an indicator variable equal to 1 if the worker works for a nonprofit firm and "nonprofit X NPS" is the interaction of nonprofit employment and industry-locality specific nonprofit share. I include either state or Super-PUMA fixed effects, as well as industry and occupation fixed effects. These fixed effects control for any industry-specific features and therefore ensure that we are comparing wage differentials within particular industries but across localities. I also include a variety of controls such as education, potential experience (calculated as *age - years of education - 6*), gender, marital status, and race. I attempt to better capture true

[4] A PUMA, or Public Use Microdata Area, is a geographic grouping with a population of at least 100,000 constructed by the Census Bureau to ensure confidentiality of respondents. A Super-PUMA is a grouping of several PUMAs and has a total population of at least 400,000; Super-PUMAs are therefore relatively uniform in population, which is one reason that I use Super-PUMAs to estimate nonprofit share rather than, for instance, counties or metropolitan areas where there is great variance in population across localities. I use Super-PUMAs rather than PUMAs to increase the precision of the constructed nonprofit share measure. PUMAs are arguably better representations of "localities" but, being much smaller, counts of workers in particular industries would be a much noisier representation of the actual number of workers per industry in the area. This trade-off is not faced in the industry-specific analysis of the next section.

(but unobserved) workforce experience by interacting gender, marital status, and "potential experience" to allow for, for instance, women's time spent out of the workforce for maternity. Throughout, standard errors are clustered at the Super-PUMA level.

The nonprofit wage differential is given by:

$$E[ln(earnings)|\text{nonprofit} = 1, X] - E[ln(earnings)|\text{nonprofit} = 0, X] = \beta_1 + \beta_2 \text{NPS}$$

If the argument above is correct, then we should observe a large negative nonprofit wage differential when NPS is low. However, this differential should become less negative as NPS increases. Thus, we would expect to find that $\beta_1 < 0$ and $\beta_2 > 0$.

6.2 *Results*

TABLE 1: Baseline specifications

VARIABLES	(1) Log(Wage)	(2) Log(Wage)
Nonprofit	-0.0357***	-0.0273***
	(0.00471)	(0.00408)
Nonprofit X NP share	0.136***	0.126***
	(0.0110)	(0.00955)
NP share	-0.0573**	-0.0668***
	(0.0259)	(0.0197)
Constant	1.954***	2.768***
	(0.0262)	(0.0164)
State FEs	X	
Super-PUMA FEs		X
Observations	899,124	899,124
R-squared	0.434	0.450

*** p<0.01, ** p<0.05, * p<0.1
Robust standard errors (clustered at super-PUMA level) in parentheses. Both specifications include additional controls as noted in the text.

Table 1 presents the estimation of the main specification, with and without Super-PUMA fixed effects. Negative nonprofit wage differentials exist at low nonprofit shares (as can be seen from

the significant and negative "nonprofit" coefficient), but this wage differential decreases as nonprofit share increases (as can be seen from the significant and *positive* "nonprofit X NPS" coefficient.)

However, turning to Table 2 which splits the sample into "high education" and "low education" groups – with "high education" defined as individuals holding a bachelor's degree or higher – we see that this result is primarily driven by highly educated individuals. Indeed, while we observe the hypothesized signs on the coefficients in Table 1 (which includes high and low education groups), when we restrict our attention to highly educated individuals (columns 3 and 4 of Table 2) we observe both the hypothesized signs and much larger magnitudes.

TABLE 2: Baseline specifications split by education group

VARIABLES	(1) Log(Wage)	(2) Log(Wage)	(3) Log(Wage)	(4) Log(Wage)
Nonprofit	-0.00303	-9.20e-05	-0.0959***	-0.0830***
	(0.00475)	(0.00449)	(0.00710)	(0.00639)
Nonprofit X NP share	0.0736***	0.0764***	0.209***	0.192***
	(0.0121)	(0.0115)	(0.0152)	(0.0136)
NP share	-0.0668***	-0.0395**	-0.0792**	-0.116***
	(0.0256)	(0.0172)	(0.0333)	(0.0316)
Constant	1.840***	2.694***	2.435***	3.081***
	(0.0239)	(0.0235)	(0.0390)	(0.0317)
Educ. group	Low	Low	High	High
State FEs	X		X	
Super-PUMA FEs		X		X
Observations	564,020	564,020	335,104	335,104
R-squared	0.340	0.363	0.320	0.335

*** p<0.01, ** p<0.05, * p<0.1

Robust standard errors (clustered at super-PUMA level) in parentheses. All specifications include additional controls as noted in the text.

Given the model and intuition behind the testable predictions, the fact that this effect is largely restricted to highly educated individuals is not surprising. The argument made in previous sections depends heavily on the idea that workers are tied to a particular industry and sort to for-profits or nonprofits *within* that industry. This assumption is more true of highly educated – and

therefore more specialized – individuals. For this reason, I focus on highly educated workers for the remainder of the paper.

To provide a clearer sense of the impact of within-industry variance in nonprofit share, Table 3 repeats the estimation of the baseline specification (with super-PUMA FEs and high education workers only), but now restricting the sample to one industry at a time. I focus on a set of industries which are prominent in the nonprofit sector and/or are often discussed in the previous literature on nonprofit wage differentials.

TABLE 3: Baseline specifications split by industry

	(1)	(2)	(3)
Industry:	Clinics	Hospitals	Research/Dev.
Nonprofit	-0.0535*	0.0272	-0.234***
	(0.0319)	(0.0262)	(0.0486)
Nonprofit X NPS	0.236	-0.00275	0.413***
	(0.207)	(0.0567)	(0.145)
Constant	3.104***	2.958***	3.533***
	(0.156)	(0.0916)	(0.147)
Super-PUMA FEs	X	X	X
Observations	13,200	51,024	5,286
R-squared	0.454	0.286	0.367

	(4)	(5)	(6)
Industry:	Nursing homes	Media	Legal services
Nonprofit	-0.0700*	-0.227***	-0.485***
	(0.0400)	(0.0330)	(0.151)
Nonprofit X NPS	0.123	0.584*	0.457
	(0.171)	(0.328)	(2.373)
Constant	3.524***	3.164***	3.555***
	(0.147)	(0.119)	(0.218)
Super-PUMA FEs	X	X	X
Observations	6,562	13,141	1,454
R-squared	0.426	0.330	0.322

*** p<0.01, ** p<0.05, * p<0.1
Robust standard errors (clustered at super-PUMA level) in parentheses. Both specifications include additional controls as noted in the text.

We see that, with the exception of the hospital industry, within each of these industries the pattern is generally consistent with that of the main results – the nonprofit wage differential is initially negative, but shrinks as nonprofit share increases. Moreover, it is not surprising that hospitals serve as the exception here given that, unlike the other industries, nonprofit share is almost always relatively high within a locality. Thus, the only observations of hospitals in the dataset are observations wherein, according to my argument, all available intrinsically motivated workers have been hired.

Finally, while the preceding results document the predicted *directional* impact of nonprofit share on wages, we should expect to see the wage differential decreasing with nonprofit share within some range but ultimately flattening out as wages equalize. To assess this, I modify the baseline specification to allow for a cubic relationship between nonprofit share and wages:

$$\begin{aligned} &ln(earnings) \\ &= \alpha + \beta_1 \text{nonprofit} + \beta_2(\text{nonprofit} \times \text{NPS}) + \beta_3 \text{NPS} + \beta_4(\text{nonprofit} \times \text{NPS}^2) + \beta_5 \text{NPS}^2 \\ &+ \beta_6(\text{nonprofit} \times \text{NPS}^3) + \beta_7 \text{NPS}^3 + [\text{controls/FEs}] \end{aligned}$$

The resulting wage differential (as a function of nonprofit share) is plotted in Figure 2, with nonprofit share along the x-axis and wage differential on the y-axis. With low nonprofit share, highly educated nonprofit workers earn roughly 12% less than their for-profit counterparts. However, this differential shrinks as nonprofit share increases until nonprofit share reaches a certain point, after which there is essentially no difference in wages across the two sectors.

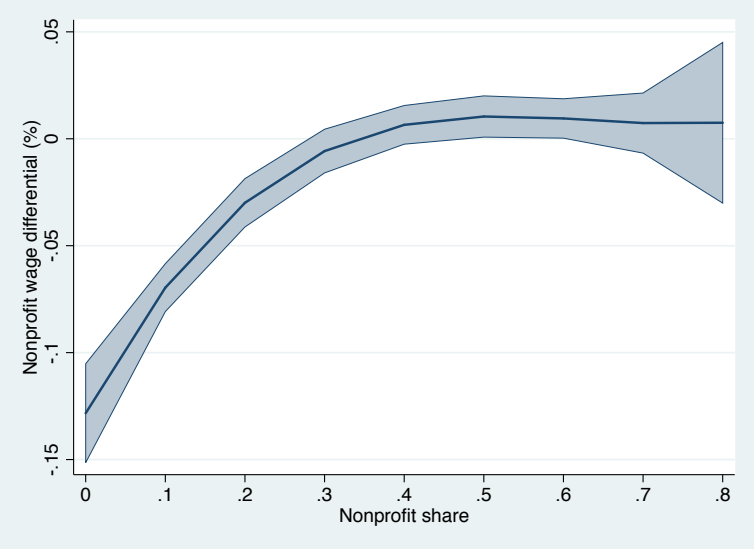

Figure 2: Wage differential as a function of nonprofit share
(Shaded area represents 95% confidence interval)

7. Nursing home industry analysis

The previous section demonstrates at an economy-wide level that the existence of a nonprofit wage differential depends heavily on the nonprofit share of labor. In particular, there exist significant negative wage differentials within industries (amongst highly educated workers) in localities with relatively low nonprofit share. These differentials are diminished in localities with higher nonprofit shares. These results are in line with what we would expect to find based on the explanation put forth in the previous section: nonprofit wage differentials exist as long as there are enough "intrinsically motivated" workers available to satisfy labor demand, after which firms must raise wages to draw in additional workers.

However, based on limitations of the Census data, there are several alternative explanations for the empirical results that have not been accounted for. Are nonprofit workers in low-nonprofit share areas simply lower quality, and their wages reflect this? Are the results driven by differences in the competitve environment faced by low-NPS versus high-NPS nonprofits? Alternatively, the results might be driven by differences in government attitudes towards nonprofits across localities.

To address these concerns, I turn to a similar but more detailed analysis of a particular industry – namely, the nursing home industry – with much richer data available to better account for these issues. I employ a firm-level dataset from the United States Department of Health & Human Services that contains information about every nursing home in the country that is registered with Meidcare or Medicaid, thereby capturing 95% of nursing homes.[5] In the data, for each nursing home I observe: nonprofit/for-profit status, location (street address), number of residents, number of beds, total labor hours per resident, and a set of quality measures.

In addition to the richness of the data, focusing on the nursing home industry is interesting in its own right as there have been a number of papers specifically examining wage differences across nonprofit and for-profit nursing homes (e.g., Borjas et al. (1983), Holtmann and Idson (1993)). The general consensus from the literature is that, after accounting for the quality of workers, there is little difference between for-profit and nonprofit nursing home pay. Thus, nursing homes provide a strong test for my central claim.

7.1 Data

In the economy-wide analysis, a rough estimate of nonprofit share was constructed from the number of nonprofit workers per industry and locality reported in the Census data, which is why the relatively large Super-PUMA was used as the main geographic unit. Given exact numbers of labor hours used for (almost) the entire universe of nursing homes, here I can construct precise nonprofit shares within more appropriate geographic groupings. In particular, the geographic concept used in this section is the "commuting zone," as defined and constructed by Tolbert et al. (1996). Commuting zones are clusters of counties organized around particular labor markets based on information from previous Censuses about individuals' place of residence and place of work. Commuting zones can loosely be thought of as being similar to metropolitan areas, but – unlike the metropolitan statistical areas (MSAs) – they cover the entire country. Thus, in this section I construct the nonprofit share within a particular commuting zone (CZ) as:

[5] The data is gathered for the department's *Nursing Home Compare* website – which is designed to help individuals find and becomes informed about nursing homes in their area. The raw data used for this website is freely available at *http://data.medicare.gov*.

$$NPS_{CZ} = \frac{(sum\ of\ labor\ hours\ across\ nonprofit\ nursing\ homes\ in\ CZ)}{(sum\ of\ labor\ hours\ across\ all\ nursing\ homes\ in\ CZ)}$$

The quality measures included in the data are constructed by the Department of Health & Human Services and are based on safety inspections and a set of ten resident health measures (e.g., "Percent of residents with pressure sores."), which therefore can be interpreted as a measure of the quality of output of employees of the nursing home.[6]

The nursing home data *does not* include any information about wages. I pair the nursing home data, which I use to construct locality-specific information such as nonprofit share, with microdata from the 2010 American Community Survey (ACS). The ACS asks many of the same questions as the Census data used in the economy-wide analysis, but only provides a 1%-sample of the United States population. The size of the sample is less critical here though, as I am not relying on this data to construct estimates of nonprofit shares (as was the case in the previous section.)

7.2 Empirical approach & baseline results

The general empirical strategy is the same here as in the previous section. I restrict my sample, drawn from the ACS data, to individuals who work in the nursing home industry and, as a baseline specification, estimate:

$$ln(earnings) = \alpha + \beta_1 \text{nonprofit} + \beta_2(\text{nonprofit} \times \text{NPS}) + [\text{controls/FEs}]$$

I include the same individual-level controls as before (race, education, the interactions of expereince, gender, and marital status), commuting-zone fixed effects (which capture the main effect of NPS), and occupation fixed effects. Standard errors are clustered at the commuting-zone level.

[6] Detailed descriptions of the construction of these quality ratings can be found at http://www.cms.gov/CertificationandComplianc/13_FSQRS.asp

The results of this baseline specification – essentially replicating the approach from the previous section but with a single industry and a better NPS measure – are reported in Column 1 of Table 4. Again, as before, we find a large and significant negative wage differential when nonprofit share is low (as indicated by the "nonprofit" coefficent) that disappears as nonprofit share increases (as indicated by the postive & significant "nonprofit X NPS" coefficient.)

TABLE 4: Wage differentials in the nursing home industry

	(1) *OLS*	(2) *OLS*	(3) *OLS*	(4) *2SLS*
Nonprofit	-0.173***	-0.528***	-0.173***	-0.352**
	(0.0533)	(0.190)	(0.0533)	(0.163)
Nonprofit X NPS	0.386***	0.542***	0.389***	0.996*
	(0.141)	(0.194)	(0.144)	(0.558)
Nonprofit X (# of residents)		3.43e-07		
		(2.97e-06)		
Nonprofit X (# of for-prof. firms)		7.46e-05		
		(0.000320)		
Nonprofit X (# of non-prof. firms)		-0.000610		
		(0.00136)		
Nonprofit X HHI			-0.135	
			(1.131)	
Constant	4.222***	4.236***	4.222***	4.092***
	(0.280)	(0.280)	(0.280)	(0.247)
Observations	2,082	2,064	2,082	2,084
R-squared	0.506	0.505	0.506	0.503

*** p<0.01, ** p<0.05, * p<0.1

Robust standard errors (clustered at commuting zone level) in parentheses. All specifications include additional controls as noted in the text.

7.3 Controlling for market conditions

Aside from eliminating noise from the NPS measure, the estimation presented in column 1 is subject to the same concerns as in the economy-wide data. Thus, in the remaining columns of Table 4, I attempt to minimize such concerns. In particular, it is possible that the economy-wide results are driven by differences in the market conditions that low- and high-NPS nonprofits

face. However, because these preceding results include locality fixed effects (Super-PUMA fixed effects in the previous section and CZ fixed effects here), "market conditions" can only impact the results insofar as they *differentially* impact the way that nonprofits and for-profits set wages.

With this in mind, in columns 2 and 3 of Table 4, I add controls for local market characteristics that were not possible to account for in the economy-wide data and – because it is only the *differential* impact of market conditions on nonprofits' wage setting that we are concerned about – all measures are interacted with whether or not the worker is employed by a nonprofit. In particular, in column 2 I control for directly observable measures: number of nursing-home residents in the CZ, number of for-profit nursing homes in the CZ, and number of nonprofit nursing homes in the CZ. These measures control for the general size of the market but also loosely account for the relative market concentrations of nonprofits and for-profits. For instance, it is possible for nonprofit share to be high either because there is one large nonprofit nursing home or many small nonprofit nursing homes. This difference of course would not be picked up by NPS alone, but could impact wage-setting. Similarly, in column 3, these measures are summarized into a single constructed variable: the Herfindahl-Hischmann Index for nursing homes within the CZ. In both columns 2 and 3, we see that these market characteristics do not significantly *differentially* impact the wages of nonprofit workers. (They presumably impact wages *generally* but, again, any general effect is captured by the CZ fixed effects.) More importantly, we see that, even accounting for these characteristics, the general result from the baseline model holds: a significant and negative "nonprofit" coefficient paired with a significant and positive "nonprofit X NPS" coefficient.

7.4 Endogeneity of nonprofit share

Alternatively, there is some concern that nonprofit share and the wage differential are endogeneous. In particular, if a state or local government provides conditions which reduce costs for nonprofits to a greater degree than elsewhere, then nonprofits may have more funds available to pay workers. At the same time, a generally more nonprofit-friendly environment is also likely to increase nonprofit share. To attempt to address this, I use a two-stage least squares instrumental variables approach, taking an instrument for nonprofit share that has been used in

previous literature (Grabowski & Hirth, 2003; Sloan et al., 2001). In particular, I instrument for NPS using the *growth in the elderly population* (ages 65 and above) in the first half of the decade, from 2001-2006. As Grabowski and Hirth (2003) discuss, for-profit nursing homes face lower start-up costs and can more quickly react to demand. Thus, a locality with higher recent growth in elderly population is likely to have a *lower* nonprofit share for reasons unrelated to local government's preferences towards nonprofits. The results of this estimation are displayed in column 4 of Table 4, and indeed the main result survives (and is in fact stronger.)

7.5 Quality of nonprofit workers

Finally, an important concern in the economy-wide anaylsis is the possibility that, in localities with low nonprofit share, nonprofit workers are less productive and the negative wage differential simply reflected this quality differential. The simple model in Section 4 predicts just the opposite. In this section, I take advantage of the nursing home quality measures constructed by the Department of Health & Human Services and assess the quality of a nursing home's output as a function of their nonprofit status and the nonprofit share in their locality. That is, taking a nursing home as the unit of observation, I estimate:

$$quality\ measure = \alpha + \beta_1 \text{nonprofit} + \beta_2(\text{nonprofit} \times \text{NPS}) + [\text{controls/FEs}]$$

where, as in previous regressions, I include commuting zone fixed effects and cluster standard errors at the commuting zone level. In one specification, I include firm-level controls: the nursing home's share of their market, registered nurse (RN) labor hours per resident, licensed practical nurse (LPN) labor hours per resident, other staff hours per resident, total residents, and ratio of total residents to total beds.

If the previous results were in fact driven by less productive workers in low-NPS areas, we would expect to see a similar pattern amongst these coefficients as we have observed in previous results: the "nonprofit" coefficient would be significantly negative while "nonprofit X NPS" would be significantly positive. However, as can be seen in Table 5, we observe just the opposite; quality at nonprofits is significantly *higher* quality when nonprofit share is low and

decreases amongst nonprofits in higher nonprofit share areas. That is, it is precisely the areas where nonprofit nursing home pay is *lowest* that nonprofit quality is *highest*, and as nonprofit share increases (and nonprofit pay increases) the quality of output at nonprofits moves closer to that of for-profits. This is consistent with a model – such as the motivation-screening model presented here – wherein lower wages in nonprofits draw in workers who are willing to put forth greater effort than is required of them.

TABLE 5: Quality differentials as a function of nonprofit share

	(1)	(2)
Nonprofit	0.712***	0.386***
	(0.0820)	(0.0819)
Nonprofit X NPS	-0.797***	-0.398*
	(0.236)	(0.221)
Firm market share		-1.413
		(0.915)
RN Hours/resident		0.231***
		(0.0289)
LPN Hours/resident		-0.116***
		(0.0414)
CNA Hours/resident		0.162***
		(0.0315)
Residents		-0.004***
		(0.001)
Fraction of beds occupied		1.916***
		(0.114)
Constant	2.664***	1.147***
	(0.0120)	(0.138)
Additional firm-level controls		X
Observations	13,393	13,089
R-squared	0.117	0.182

*** p<0.01, ** p<0.05, * p<0.1
Robust standard errors (clustered at commuting zone level) in parentheses.

8. Conclusion

In this paper, I provide one possible explanation for the existence of nonprofit wage differentials in some industries but not others (as documented most systematically by Leete (2001), but also by a long line of papers examining wage differentials within particular industries) and, in doing so, attempt to contribute to a more general discussion of whether such wage differentials are

driven by "labor donations" or industrial composition of the sectors. Specifically, I build on a point made by Preston in 1989; even when some workers are willing to donate their labor, in order for a wage differential to exist, it must be in firms' interests to *maintain* low wages. Once the number of workers demanded by nonprofits exceeds the number of "intrinsically motivated" workers, firms must raise their wages. This, then yields the prediction that the existence of a nonprofit wage differential within a particular industry depends on how much labor nonprofits demand relative to for-profits, with wage differentials existing only in industries with relative low nonprofit shares of labor.

I provide empirical evidence consistent with this suggestion. To avoid making comparisons across industries which are very different, I instead examine nonprofit wage differentials as a function of nonprofit share *within industries* but *across localities*, first through a detailed set of industry fixed-effects in an economy-wide analysis and by examining one industry in more detail. Throughout, it is indeed the case that wage differentials exist when nonprofit share is low – and firms are able to draw in intrinsically motivated workers – that then disappear as nonprofit share increase – with firms required to draw in extrinsically motivated workers. Using a detailed firm-level dataset that encompasses 95% of nursing homes within the United States, I provide evidence that suggests that these results are *not* driven by differences in competitive environments or endogeneity stemming from differential government treatment of nonprofits across localities. I also show that in the nursing home industry, the quality of nonprofit work is *highest* when nonprofit share is low and decreases as nonprofit share increases. This result is striking as it demonstrates that the nonprofit workers being paid the least (relative to their for-profit counterparts) are also the workers who are producing the highest quality work.

Thus, empirically, there is clear evidence that the existence of nonprofit wage differentials depends on nonprofit share. Moreover, these results are consistent with the explanation I offer for differences in wage differentials across industries. However, I of course do not claim this explanation to be the *sole factor* driving differences in wage determination across industries. For instance, an important factor which has not been discussed here is the fact that, in some industries, the output of nonprofit and for-profit firms within an industry does not differ greatly. As I noted above, this is not necessary for the explanation I have provided; instead, the argument

I have made here only requires that workers have *some reason* to prefer working at a nonprofit. Nonetheless, I do not mean minimize the importance of such factors. Instead, the goal of this paper is to point out that, holding other factors constant, nonprofit share of labor is one important factor in determining whether a wage differential does or does not exist.

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